

A SURVEY ON DIVERSITY OF ANTS IN LUMDING

JASHODEB ARJUN & RAJESH PAUL

Zoology Department, Lumbding College, Lumbding, 782447, Assam, India

ABSTRACT

Ants are one of the ecologically significant part of nature which plays an important role in the terrestrial ecosystem to increase the development and the quality of the soil. Ants are reported as one of the leading predators among the insect community which help to keep the pest population in control. Current investigation was undertaken to study the diversity and distribution of ants in the forests of Lumbding, in the Lumbding human habitat and in the rest of the local open areas. Surprisingly, a total number of six species of ants belonging to four genera and two subfamilies under the family Formicidae were found during the survey. The identified species include Camponatus compressus, Camponatus rufoglaucus, Camponatus augoisticolis, Anoplolepis gracilipes, Dorilus orientalis and Oecophyla smaragdina. The species diversity of ants were found highest in the dense Lumbding forest area followed by open area and human habitat area. Our preliminary investigation came out with the hope that more work in Lumbding biodiversity will reveal many new species of ants and their livelihood over there.

KEYWORDS: Ant, Lumbding forest, Distribution, Diversity & Formicidae.

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1. INTRODUCTION

Ants are an indispensable biotic component of ecosystem playing a vital role in terrestrial ecosystem as an ecosystem engineer. In general, ants are bio indicators which evaluate the forest quality and environmental controls as ants are associated with various biological cyclic process like nitrogen cycle, carbon cycle, etc. Like earthworms, ants move inside the soil loosening the soil and resulting in increasing air and water movement under the ground. Ants turn and aerate the soil which helps in transport of oxygen and water into the roots of plants. The ants constitute an important fraction of animal biomass in terrestrial ecosystem (Holldobler & Wilson, 1999; Anderson, 1997). They also act as a pollinator. They help in seed dispersal in new areas. Reports revealed that ants are social insects; they also live in complex colonial societies like bees and wasps where the adult cares for the young. Besides, in Australia, Oecophyla ants are used as biological control of pests of cashews and mangoes (Lach *et al.*, 2010). Ants have been reported to form nomadic armies. There are more than 25,000 species of ants present all over the world. The diversity and abundance of ants are influenced by anthropogenic activity (Philpott *et al.*, 2010).

Ants belong to the family Formicidae, order Hymenoptera and class Insecta. The family Formicidae is divided into 21 subfamilies and 290 genera (Bolton, 1990). Recently a new subfamily Martialinae has been added to the family Formicidae (Chavhan *et al.*, 2011). The Indian ant diversity constitutes 45% of Myrmicinae subfamily. In 2016, a survey showed 828 species of ants are available in India (Bharati *et al.*, 2016). In Jorhat district of Assam, six species of ants were found during an investigation (Rajkumari *et al.*, 2012). Lumbding with its deep reserve forest have rich faunal diversity of birds, elephants, beetles, termites, large number of soil arthropods and

hence we expected it will possess good diversity of ants also.

2. MATERIALS AND METHODOLOGY

2.1 Study Site

Lumding is located in geological location of 25°75' N and longitude 93°17' E. The climate is tropical mesothermal with high humidity. The temperature ranges from 4-5° in winter & 26° to 40°C in summer. The average annual precipitation 448.79 inches with relative humidity of 85%.

The vegetation types found in Lumding are trees, shrubs and paddy lands. The survey of the ants are carried out in three study area-

- open area,
- forest area and
- human habitat area.

2.2 Survey Time

The survey was carried out twice a week from 6 am to 11 am on each site from June to September 2019.

2.3 Sampling of Ants

The collection of ants were performed followed by standard protocol of Bharati *et al.*, 2016.

Various sampling techniques include-

- sugar, baits, leaf litter technique,
- beating vegetation,
- hand collection were carried out for sampling of ants.

The survey was conducted during the month of June to September 2019. During each study, 10m transects were selected along which the samples were collected with different sampling methods. Six sugar baits were placed in each transects with 2m spacing between baits.`

Hand collection was carried out within an area of 5m on either side of the transects by searching for ants on rotten logs, right of the transect stamps, dead and live branches twigs, low vegetation termite mounds and under stones. Ant foraging in the vegetation were sampled by beating the vegetation (to dislodge ants from plants on sheet). Hand collection was carried out within an area of 5m left and right of the transects.

2.4 Preservation of Ants

After collection, the ants were washed properly and preserved in 70 % ethyl alcohol.

2.5 Identification of Ants

The collected ant samples were identified with the help of Leica Stereo Microscope based on identification key (Bolton,1994; Holdobler *et al.*, 1999). Various types of taxonomic keys including body color, presence of petiole, presence of spines, number and position of antennae were used for identification.

2.6 Data Analysis

Shannon Weiner diversity index was used for data analysis of ants diversity.

3. RESULT AND DISCUSSIONS

There exist around 12,570 species of ants all over the world. In the present study, a total of six individual belonging to six species, two genera and family formicidae were recorded. Maximum species diversity was observed in forest area and lowest in human habitat and open area.

Of the total six species, three species of *Compressus* were common in all habitats. The identified species include *Camponatus compressus*, *Camponatus rufoglaucus*, *Camponatus augoisticolis*, *Anoplolepis gracilipes*, *Dorilus orientalis* and *Oecophyla smaaragdina*. All six species were found only in the forest area. Lesser density of selected organism in human habitat might be due to various anthropogenic activities. The species diversity on the basis of Shannon's –Weiner's index among different habitat, found highest in forest area and lowest in open area.

Table 1: Identification of Ant Species

Serial No.	Name of Species	Name of Genus	Name of Family	Name of Sub-Family
1	<i>Anoplolepis gracilipes</i>	<i>Anoplolepis</i>	Formicidae	Formicinae
2	<i>Camponatus compressus</i>	<i>Camponatus</i>	Formicidae	Formicinae
3	<i>Camponatus rufoglaucus</i>	<i>Camponatus</i>	Formicidae	Formicinae
4	<i>Camponatus augoisticolis</i>	<i>Camponatus</i>	Formicidae	Formicinae
5	<i>Dorilus orientalis</i>	<i>Camponatus</i>	Formicidae	Dorilinae
6	<i>Oecophyla smaaragdina</i>	<i>Camponatus</i>	Formicidae	Formicinae

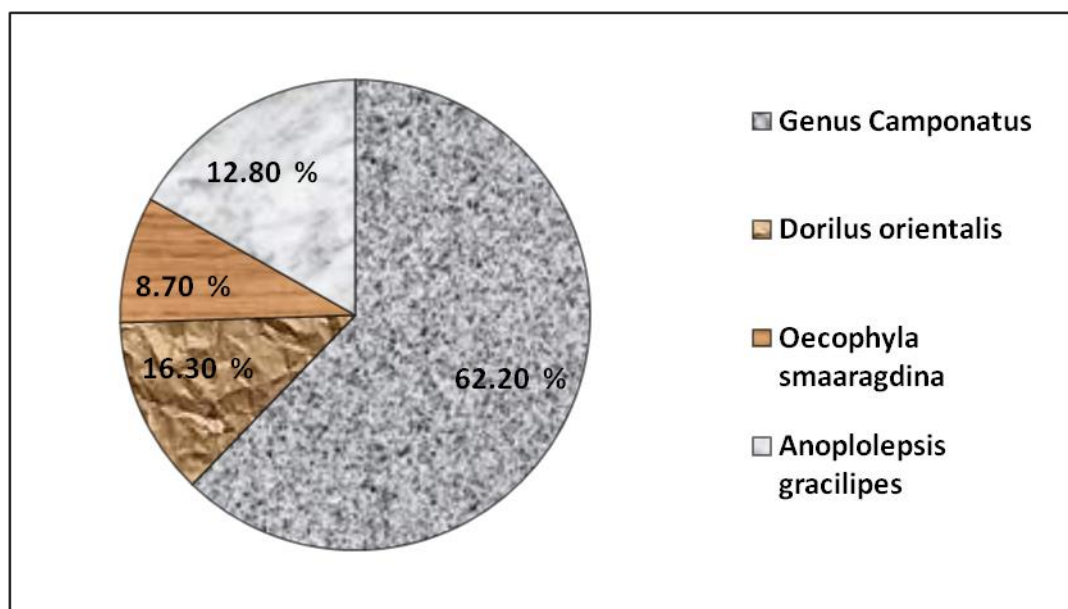


Figure 1: Graphical Representation of ant Diversity in Lumding.

Table 2: Habitat Wise Distribution of Ants

Serial No.	Name of Species	Collection Site		
		Open Area Site	Forest Area Site	Human Habitat Site
1	<i>Anoplleosis gracilipes</i>	—	+	+
2	<i>Camponatus compressus</i>	+	+	+
3	<i>Camponatus auguisticolis</i>	+	+	+
4	<i>Camponatus rufoglaucus</i>	+	+	—
5	<i>Dorilus orientalis</i>	+	+	+
6	<i>Oecophyla smaragdina</i>	—	+	+
Shannon-Weiner Index		2.256	2.482	2.327

As Assam is considered among the biodiversity hotspots and is enriched with blessings of mother nature so we kept our fingers crossed and were absolutely hopeful that Lumding will positively come out with new species of ants. Lumding reserve forest locality is richly populated with ant diversity. The findings of our study explored with six ant species, belonging to four genera, representing two subfamilies - Formicinae and Dorlinae under family Formicidae. The ant diversity is influenced by topography, flora, fauna and climatic condition of a particular area. So, it can be predicted that topography, abundant spread of plant community and suitable climatic conditions of Lumding Reserve forest provides appropriate shelter and foraging grounds for ants. The study explored that the relative distribution of genus *Camponatus* was high followed by genus *Anoplleosis*. Bharati *et al.* (2009) also observed similar findings while studying the diversity of ants in Kashmir. The subfamily Myrmicinae was more dominant followed by Formicinae and Ponarinae while studying the diversity of ants in homogenous and heterogeneous rubber plantation in Sonkhla province, Southern Thailand by Watanasit *et al.* (2011). Sonune (2016) recorded Myrmicinae (six species) as most diverse followed by Formicinae (four species), Pseudomyrmecinae (three species), ponarinae (two species) Dolichoderinae (one species) and Acemetinae (one species) around Gautala Autramghat Sanctuary, Aurangabad. According to Ravi *et al.* (2015) subfamily Myrmicinae was most dominant followed by Formicinae (eight species), Ponarinae (two species) and Dolichoderinae (two species) in agro ecosystem and grasslands of Jamkuntu area and Karimnagar district.

The number of trees and canopy cover provides foraging places (Sonune *et al.*, 2016). Reports revealed that with the rising rate of vegetation, species richness also rises and with the rising rate of distribution ant species richness decreases (Paul, *et al.*, 2016; Momin *et al.*, 2018). Whereas, in comparison to human habitat area, the diversity is less in hilly area and open area. This might be due to various kinds of human activities which exploited the ant diversity less around. Researches reported that the diversity of ants depends on anthropogenic activities. Many earlier researchers such as Saikia (2014), Sonune *et al.*, (2016) suggested that due to anthropogenic activities the population of ants reduces.

4. CONCLUSIONS

From our investigation, it can be concluded that Lumding is densely populated with different ant species for which the climate, vegetation and topology of Lumding might have played a great role. Hence, a more detailed, thorough and continuous research is must to explore the occurrence, habitat, feeding, reproductive nature and other behavioural aspects of ant species of the Lumding region.

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